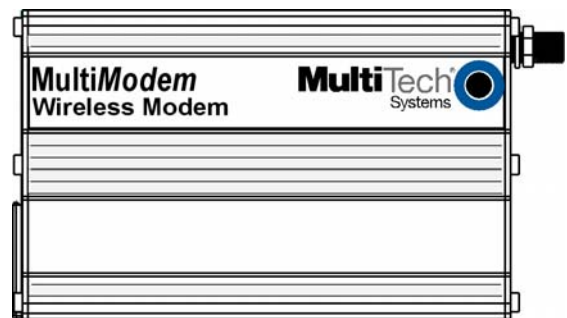

MultiModem[®] CDMA USB Wireless Modem

MTCBA-C-U



User Guide



MultiModem® CDMA USB User Guide
Wireless Modem
MTCBA-C-U
S000345G, Revision G

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Revision History

Revision	Date	Description
A	07/13/04	Initial release.
B	05/05/05	Revised installation procedures.
C	09/15/05	Added the WEEE update.
D	10/13/05	Changed temperature range, added humidity rating, changed modem maintenance, and warranty chapter.
E	05/04/06	Updated USB Plug & Play software installation.
F	06/30/06	Added AT command examples and frequently asked questions. Reorganized the chapters. Changed the location of the Activation Notices. Added a note about current documentation on Web site. Many other minor changes made.
G	09/05/06	Removed caution about not connecting USB cable to pc.

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World Headquarters

Multi-Tech Systems, Inc.
 2205 Woodale Drive
 Mounds View, Minnesota 55112
 (763) 785-3500 or (800) 328-9717
 Fax: (763) 785-9874
 Internet Address: <http://www.multitech.com>

Technical Support

Country	By Email	By Phone
France:	support@multitech.fr	+(33) 1-64 61 09 81
India:	support@multitechindia.com	+91 (124) 2340780
Europe, Asia, Africa:	support@multitech.co.uk	+(44) 118 959 7774
U.S., Canada, all others:	support@multitech.com	(800) 972-2439 or +(763) 717-5863

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Chapter 1 – Product Description and Specifications

Product Description

The Multi-Tech MultiModem CDMA USB is an external data/fax/voice wireless modem. It also supports mobile originated short message service (SMS) and mobile-terminated SMS. It offers standards-based multi-band CDMA 2000 1xRTT performance. This ready-to-deploy, standalone modem allows developers to add wireless communication to products with a minimum of development time and expense. The MultiModem CDMA USB Wireless modem is based on industry-standard open interfaces, is fully approved, and can be desktop or panel mounted.

Models:

MTCBA-C-U-N1 is a generic 800/1900 MHz CDMA USB modem that must be programmed with Provisioning Information (PRI) and a Preferred Roaming List (PRL). (A-key = Random). Recommended for developers.

MTCBA-C-U-N2 is an 800/1900 MHz CDMA USB modem provisioned for Sprint networks. USA

MTCBA-C-U-N3 is an 800/1900 MHz CDMA USB modem provisioned for Verizon networks. USA

MTCBA-C-U-N4 is an 800 MHz CDMA USB modem for regions that use R-UIM cards. (R-UIM).

MTCBA-C-U-N9 is a generic 800/1900 MHz CDMA USB modem must be programmed with Provisioning Information (PRI) and a Preferred Roaming List (PRL). (A-key = 0). Recommended for developers.

MTCBA-C-U-N12 is an 800/1900 MHz CDMA USB modem provisioned for Bell Mobility. Canada.

MTCBA-C-U-N14 is an 800/1900 MHz CDMA USB modem provisioned for Alltel networks. USA.

Other Product Codes:

NAM is the model for US and Canada

E/U is the model for Europe and the rest of the world

A Note About Documentation:

Multi-Tech Systems, Inc. reserves the right to revise this publication and to make changes from time to time in the content hereof without obligation of Multi-Tech Systems, Inc., to notify any person or organization of such revisions or changes. Check Multi-Tech's Web site for current versions of our product documentation.

Features

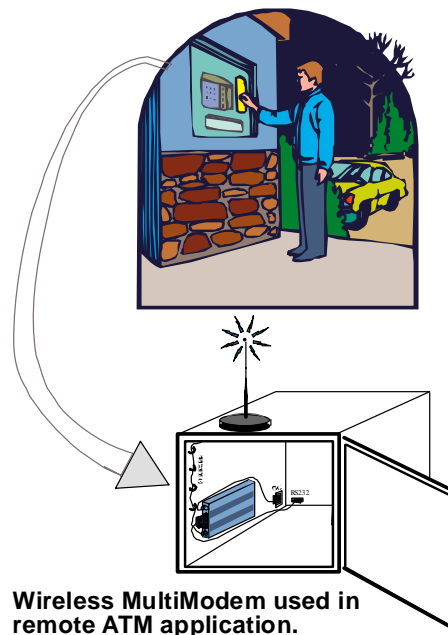
• CDMA2000 1xRTT operation
• Dual-band 800/1900 CDMA
• 800 MHz with R-UIM support
• Class 2.0 Group 3 FAX
• Desktop or panel mounting
• Short Message Service features including SMS mobile originated, SMS mobile terminated, cell broadcast, Over the Air Activation (OTA), OTASP, OTAPA
• Voice features include DTMF, telephony, OCELP 13K, echo cancellation
• SMA antenna connector
• Serial interface supports DTE speeds to 230K
• AT command compatible
• CDMA IS-95-A, IS-95B; backwards compatible
• Packet data up to 153K bps forward and reverse
• Circuit-switched data up to 14.4K bps
• Phone book management and Personal Information Management (PIM)
• Fixed dialing number
• Supplementary services including call forwarding, call barring, multiparty, call waiting and call hold, calling line identification, closed user group, call transfer
• Numerous LEDs present operational status
• Real time clock
• Alarm management

Application Overview

Application Types

With packet data speeds up to 153K bps, the MultiModem CDMA USB Wireless Modem is targeted at applications that periodically need to send or receive data over a wireless network. It is an ideal solution for:

Appliances
ATM Terminals
Automotive
Data Collection
Gas Pumps
Industrial and Medical Remote Monitoring Systems
Remote Diagnostics
Remote Metering
Security Systems
Vending/Gaming Machines
Other devices requiring wireless connectivity.
Note: The Wireless MultiModem must be mounted with at least 8 inches (20 cm) of clearance from the human body.



Benefits/Features in Applications

Short Development Time. The MultiModem CDMA USB Wireless Modem can make your existing and next generation device, machine, or system, communication-ready without requiring any hardware changes to its design. It actually provides faster time-to-market because it relieves the burden and expense of obtaining network and RF approvals. This complete, ready-to-deploy wireless modem allows you to enhance your product while you focus on developing its core features.

Voice Features. The MultiModem CDMA USB provides telephony and Dual Tone Multi Frequency (DTMF) functionality as well as QCELP (13K) and echo cancellation.

Short Message Services. The MultiModem CDMA USB Wireless Modem offers SMS features such cell broadcast, Over the Air Activation (OTA), OTASP, and OTAPA. It is SMS Mobile Originated and SMS Mobile Terminated.

Compatible Supplementary Services. The MultiModem CDMA USB Wireless Modem is compatible with supplementary services such as call forwarding, call barring, multiparty, call waiting and call hold, calling line identification, closed user group and explicit call transfer.

Management Features. The MultiModem CDMA USB Wireless Modem provides advanced management features including phone book management, fixed dialing number, and real time clock and alarm management.

Industry-standard Modem Commands. The MultiModem CDMA USB Wireless Modem provides industry-standard AT-style commands for ease of integration into your existing software application.

Industrial Chassis. The MultiModem CDMA USB Wireless Modem is packaged in a rugged, water resistant, industrial chassis. The chassis has an RS-232 DE-15 Voice/Data interface connector and a permanent screw-type power connector. It also has an SMA antenna connector. The chassis can be side-mounted on a panel or top-mounted on a desktop or other surface. A set of LEDs indicates the modem's operational status.

Packet-Switched Data. The MultiModem CDMA USB Wireless Modem supports CDMA2000 1xRTT packet-switched cellular data. This enables mobile Internet functionality by allowing interworking between the existing Internet and the cellular network at speeds up to 153.6K bps (forward and reverse). Any service that is used over the fixed Internet today – File Transfer Protocol (FTP), web browsing, chat, e-mail, telnet – is available over the cellular network, as well.

Circuit-Switched Data (CSD). The MultiModem CDMA USB Wireless Modem supports CDMA IS-95A and IS-95B circuit-switched cellular data connections. Circuit-switched data connections support speeds up to 14.4K bps as well as Class 2.0 Group 3 fax. CSD cellular wireless connections are ideal for applications that require a quick wireless replacement of an existing point-to-point analog dial-up connection. They integrate seamlessly with your current application requiring little infrastructure change.

Internet-Enabled. Some models of the MultiModem CDMA USB Wireless Modem include an embedded TCP/IP protocol stack to bring Internet connectivity to any device without making changes to its hardware design. Using the Internet protocols and the wireless connection to an IP network, the modem sends and receives data over the Internet. It can also serve a single web page in response to a web browser request.

Safety

General Safety

The modem is designed for and intended to be used in fixed and mobile applications. “Fixed” means that the device is physically secured at one location and is not able to be easily moved to another location. “Mobile” means that the device is designed to be used in other than fixed locations.

Caution: Maintain a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter’s antenna and the body of the user or nearby persons. The Modem is not designed for or intended to be used in portable applications within 20 cm. (8 inches) of the body of the user.

RF Interference Issues

It is important to follow any special regulations regarding the use of radio equipment due in particular to the possibility of radio frequency, RF, interference. Please follow the safety advice given below carefully.

- Switch OFF your Wireless MultiModem when in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action or both.
- Switch OFF your Wireless MultiModem when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Switch OFF your Wireless MultiModem in hospitals and any other place where medical equipment may be in use.
- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or where blasting operations are in progress.
- There may be a hazard associated with the operation of your Wireless MultiModem close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.
- Operation of your Wireless MultiModem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers’ recommendations.

Vehicle Safety

- Do not use your MultiModem while driving.
- Respect national regulations on the use of cellular telephones in vehicles. Road safety always comes first.
- If incorrectly installed in a vehicle, the operation of Wireless MultiModem telephone could interfere with the correct functioning of vehicle electronics. To avoid such problems, be sure that qualified personnel have performed the installation. Verification of the protection of vehicle electronics should be part of the installation.
- The use of an alert device to operate a vehicle’s lights or horn on public roads is not permitted.

Maintenance of Your Modem

Your Wireless MultiModem is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestions below will help you to enjoy this product for many years.

- Do not expose the Wireless MultiModem to any extreme environment where the temperature is above 50°C or humidity is above 90% noncondensing.
- Do not attempt to disassemble the Wireless MultiModem. There are no user serviceable parts inside.
- Do not expose the Wireless MultiModem to water, rain, or spilled beverages. It is not waterproof.
- Do not place the Wireless MultiModem alongside computer discs, credit or travel cards, or other magnetic media. The phone may affect the information contained on discs or cards.
- The use of accessories not authorized by Multi-Tech or not compliant with Multi-Tech's accessory specifications may invalidate the warranty of the Wireless MultiModem.
- In the unlikely event of a fault in the Wireless MultiModem, contact Multi-Tech Tech Support.

Your Responsibility

This Wireless MultiModem is your responsibility. Please treat it with care respecting all local regulations. It is not a toy. Therefore, keep it in a safe place at all times and out of the reach of children.

Try to remember your Unlock and PIN codes. Become familiar with and use the security features to block unauthorized use and theft.

Package Contents

Single Package (one unit)	Bundled Package (multiple units)
1 modem 1 mounting bracket 1 Quick Start Guide	<i>Each individual package in the bundle includes the following:</i> 1 modem 1 mounting bracket 1 USB cable 1 antenna 4 adhesive-backed rubber feet for table-top mounting 1 MultiModem CD 1 Quick Start Guide

Parts to be Supplied by End User

- mounting screws (screw shaft diameter = .17" max.)
- antenna (Basic Package)

Specifications

General Specifications	
Mechanical Dimensions & Weight	4.3" L x 2.4" W x 0.94" H; 4.2 oz. (11 cm x 6.1 cm x 2.4 cm; 119 g)
Connectors & Fasteners	Antenna Connection type: SMA jack Interface Connector: USB Type B Phone Handset: Modular Handset Jack
Operating Temperatures	-20° to +55°C
Storage Temperatures	-40° to +85°C
Humidity	Relative humidity 20% to 90% noncondensing
Certifications	EMC: FCC Part 2, 15, 22, 24, EN 55022, EN 55024 Safety: cUL, UL 60950, EN 60950 Network: CDG 1 & 2

Functions – CDMA USB Modes

Mode	Description
Standard	Dual Band 800/1900 CDMA
Interface	USB 12 Mbps. AT command set based on TIA/EIA/IS707.3, V.25ter and CDMA 07.05 & 07.07
SMS	Mobile Originated (MO) and Mobile Terminated (MT), Over the Air Activation (OTA), OTASP, and OTAPA
Data	Asynchronous 2400, 4800, 9600, and 14400 bps. Transparent and Non-Transparent modes. Mode 3.1 KHz (PSTN) and V110 (ISDN).
Fax	2400/4800/7200/9600 bps Class 2.0 Group 3 compatible.

Electrical Characteristers

Electrical Characteristics	
Switching the modem on/off	The device is permanently powered by the PC.
Voltage Range	Voltage range : 4.75 to 5.25 coming from the PC
Overtoltage and Undervoltage	Correct operation of the Wireless MultiModem in communication mode is not guaranteed if input voltage falls below 4.75.

Current Requirement			
Parameters	800 MHZ	1900 MHZ	Unit
	Typ.	Typ.	
Input supply current in comm. mode at full Tx power	500	500	mA
Input supply current in comm. mode at average Tx power	240	250	mA
Input supply current in idle mode	50	50	mA

Antenna/RF Specifications

	CDMA 800	CDMA 1900
Frequency	824 to 894 MHz	1850 to 1900 MHz
Impedance	50 ohms	
VSWR	<2	
Typical Radiated Gain	0 dBi on azimuth plane	

Interfaces

The Wireless MultiModem has several interfaces:

- LED function indicating operating status
- External antenna (via SMA connector)
- USB connector
- Microphone and speaker (via handset jack)

LEDs

LED Indicators	
TD	Transmit Data. Light is on when modem is transmitting data.
RD	Receive Data. Light is on when modem is receiving data.
CD	Carrier Detect. Light is on when data connection has been established.
LS	Line Status. Continuous “on” state indicates that the wireless modem is not registered on the network. Flashing state indicates registration on network. Off state. Modem is off (not ready) or in download mode.
TR	Terminal Ready. Commonly called “Data Terminal Ready.” This is a readiness signal from the PC.
PWR	Power. Light is on continuously to when power on. (On the IP model, this LED flashes when power is on.

AT Command Information

AT commands for the CDMA wireless modem are published in a separate CDMA AT Commands Reference Guide included on the MultiModem CD and posted on the Multi-Tech web site.

IP commands for CDMA modems are also published in a separate CDMA AT Commands Reference Guide included on the MultiModem CD and posted on the Multi-Tech web site.

Chapter 2 – Activation and Installation

Step 1 – Activate Your Wireless Account

Multi-Tech – A Certified National Activation Agent

Multi-Tech Systems, Inc. is a certified national activation agent for Cingular and Sprint wireless. For more information about available data plans and to purchase and activate a wireless data account, contact Multi-Tech at 888-288-5470.

Pre-Configured Multi-Tech Products

Each Multi-Tech wireless product has been pre-configured to operate on a wireless network.

Activate Your Wireless Account

Please see the wireless account Activation Notices located on the MultiModem CD. Choose the one for your wireless network provider and follow the directions to activate your account.

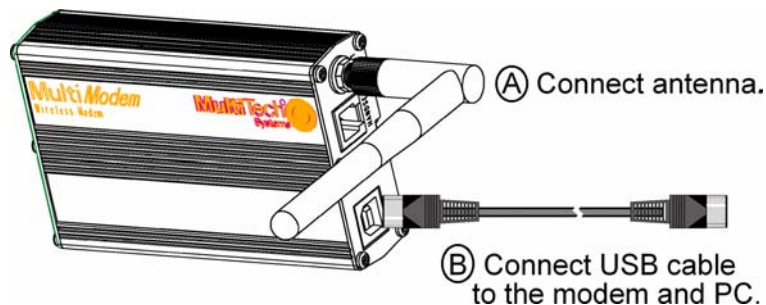
Phone Numbers for the Wireless Modem

Every wireless modem will have its own unique phone number. The phone number will be given to you by your wireless service provider. Wireless provider implementations may vary.

Step 2 – Hook up the Antenna and USB Cable

Antenna

Connect a suitable antenna to the SMA connector (see antenna specifications on page 10).

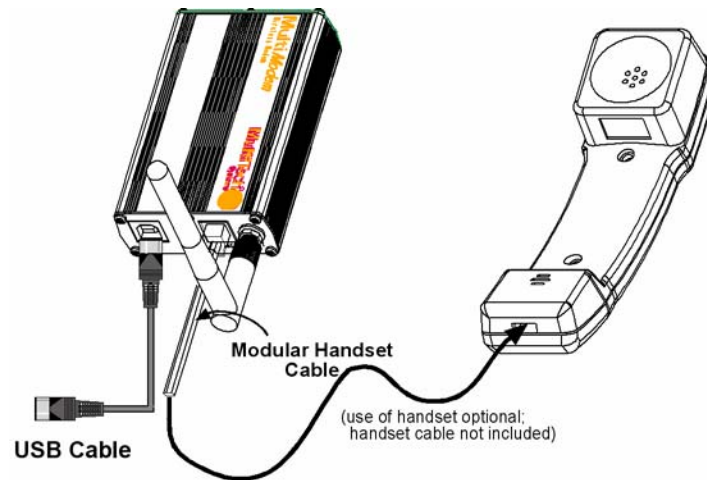


USB Cable

Connect the USB cable to the modem and to the USB connector on the PC.

Step 3 – Handset Connection (Optional)

If you intend to use a phone handset, connect it to the MultiModem now.

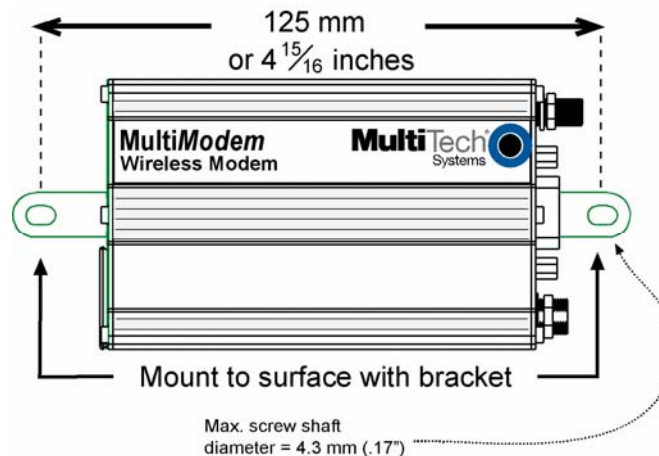


Step 4 – Attach the Modem to a Flat Surface (Optional)

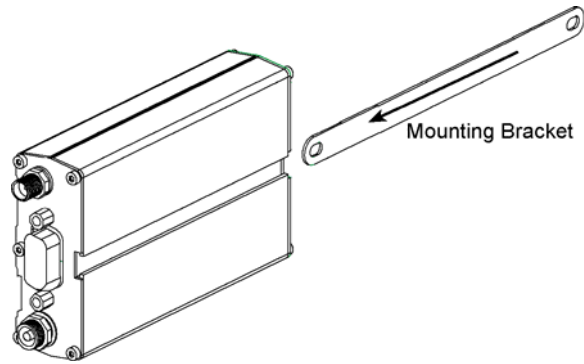
To mount the Wireless MultiModem, do the following:

1. Obtain mounting screws (two are needed) that are appropriate for the surface on which you will mount the modem. For example, one might use two 6-32 self-tapping screws 5/8" in length to mount the unit in a truck to the wall of the cab behind the passenger's seat.
2. Typically, the unit is mounted against a flat surface into which holes can be drilled. The mounting holes (center-to-center) must be separated by 125mm or 4 -15/16 inches.

Drill the mounting holes at the desired mounting location.



3. Slide the mounting bridles into the corresponding slots on the backside of the modem chassis.



4. Attach the modem with two screws to the mounting surface at the desired location on the equipment.

Step 5 – Install the Modem Driver

Introduction

Compatibility: This wireless MultiModem is compatible with Windows Operating Systems 2000/2003/XP and Linux.

Windows Drivers: The wireless MultiModem USB driver must be installed in your computer's program directory. The procedure differs depending on the operating system and how it is set up. The drivers are located on the MultiModem CD.

Linux Drivers: Linux Operating System drivers are also located on the CD in the Linux directory. Refer to the Readme file (also in the Linux directory) for the correct driver file and installation guide for your distribution/version of Linux.

Overview of Windows Driver Installation: Three install wizards guide you through the software Installation in this order:

- **Part A** installs the USB Driver.
- **Part B** associates the PC port with the USB Driver, and finally
- **Part C** installs the modem .inf file.

Installing the Modem Driver in Windows XP/2003

This installation assumes a Windows XP or Windows 2003 operating system. Windows XP/2003 are identical in the methods they use for installing modem drivers.

Part A for Windows XP/2003: Installing the USB Driver

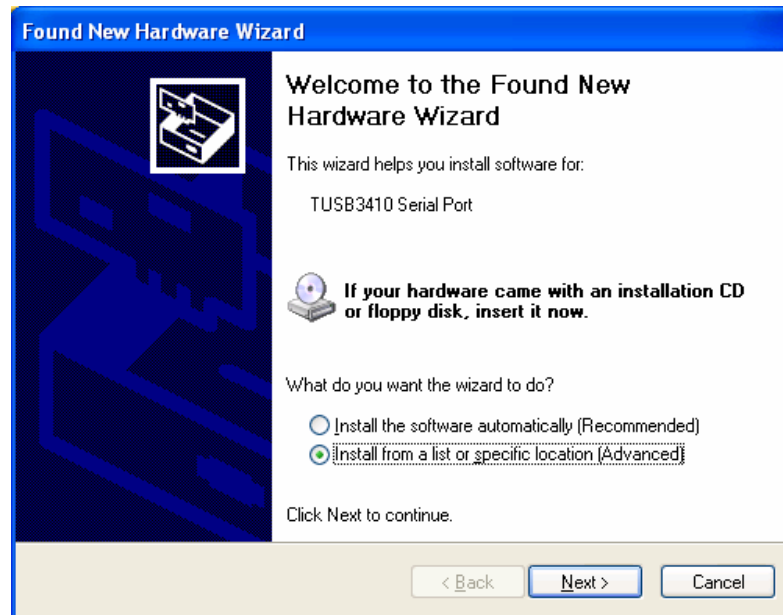
1. Connect the USB cable between the MultiModem and the PC.
2. Insert the MultiModem CD into your CD-ROM drive. The CD uses the Autorun feature, and after a brief delay, the *MultiModem Setup – Welcome* screen appears. Close the *Welcome* screen.



In some situations the operating system will display a *Found New Hardware Wizard* screen and asks you: *Can Windows connect to Windows Update to search for software?* Select **No, not this time.** Then click **Next.**

3. The *Found New Hardware Wizard* screen now displays the TUSB3410 Serial Port device. This is the first of three New Hardware Wizards that will appear.

4. Click on *Install from a list or specific location (Advanced)*.
5. Click **Next**.



6. The next screen is the *Please choose your search and installation options*. Ensure that **Search for the best driver in these locations with Search removable media (floppy, CD-ROM...)** is selected. Click **Next**.
7. A Windows Logo Testing screen may appear. Some operating systems may not give you this screen. Click **Continue Anyway**.
8. At the *Completing the Found New Hardware Wizard* screen, click **Finish**. Installation of the USB driver is now complete.

The second *Found New Hardware* wizard will start automatically to associate the PC port with the USB driver.

Part B for Windows XP/2003: Associating PC Port with USB Driver

1. If the *Welcome to the Found New Hardware Wizard* screen – *Can Windows connect to Windows update to search for software?* appeared when you were installing the driver, it will come up here also.
Select **No, not this time**. Then click **Next**.
2. The *Welcome to the Found New Hardware Wizard* screen will appear with the **Texas Instruments UMP Serial Port** as the device to be installed. This is the beginning of the *Found New Hardware* sequence for the port.
3. Click **Install from a list or specific location (Advanced)**.
Click **Next**.
4. *Please choose your search and installation options* screen appears.
5. Ensure that **Search for the best driver in these locations** is set and click on **Search removable media (floppy, CR-ROM...)**.
Click **Next**.
6. A second *Windows Logo Testing* screen may appear depending on operating system settings. This screen pertains to the **MTS CDMA USB – Serial Port**.
Click **Continue Anyway**.
7. The *Completing the Found New Hardware Wizard* screen appears.
8. The association between the serial port and the USB driver has been made.
Click **Finish**.

The third *Found New Hardware* wizard will start automatically to install the modem inf file.

Part C for Windows XP/2003: Installing the Modem INF File

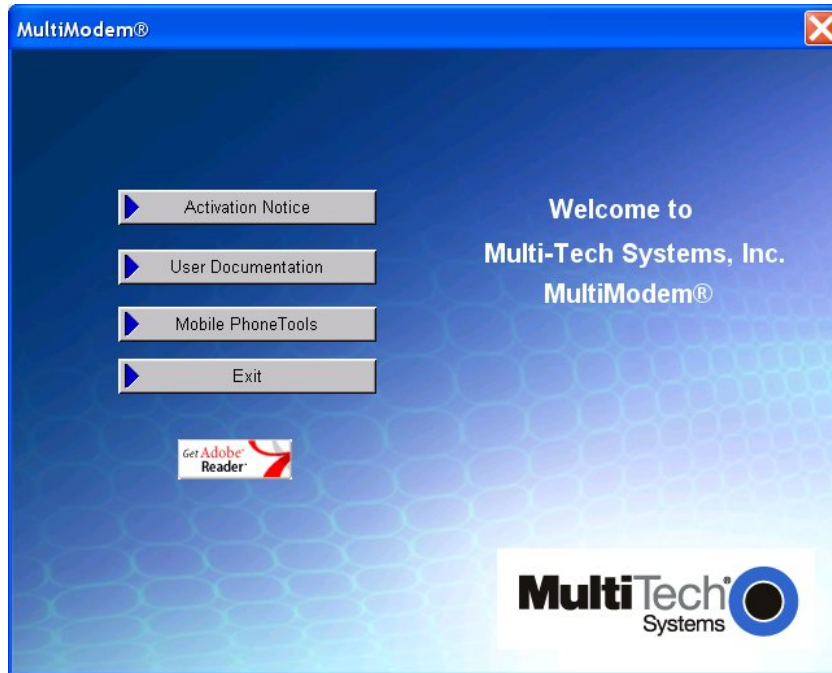
1. If the *Welcome to the Found New Hardware Wizard* screen asking – *Can Windows connect to Windows update to search for software?* appears again, select **No, not this time**. Then click **Next**.
2. The *Found New Hardware Wizard* screen appears for the **Multi-Tech – CDMA Modem**.
3. Click on **Install from a list or specific location (Advanced)**.
Then click **Next**.
4. The *Please choose your search and installation options* screen appears.
5. Ensure that **Search for the best driver in these locations** is set and click on **Search removable media (floppy, CD-ROM)**.
Click **Next**.
6. In the *Please select the best match for your hardware from the list below*, select the Multi-Tech Systems USB CDMA Wireless Modem Version 6.3.30.6 that is listed in the root of the CD-ROM directory.
Then click **Next**.
7. The final *Windows Logo Testing* screen may appear depending on operating system settings. This screen pertains to the creation of a modem entity in the operating system that accommodates the wireless USB MultiModem.
Click **Continue Anyway**.
8. The *Completing the Found New Hardware Wizard* screen appears.
Click **Finish**.

With the modem .inf file successfully installed, the entire software installation procedure for the Wireless USB MultiModem is complete.

Installing the Modem Driver in Windows 2000

Part A for Windows 2000: Installing the USB Driver

1. Connect the USB cable between the MultiModem and the PC.
2. Insert the MultiModem CD into your CD-ROM drive. The CD uses the Autorun feature, and after a brief delay, the *MultiModem Setup – Welcome* screen appears. Close the *Welcome* screen.

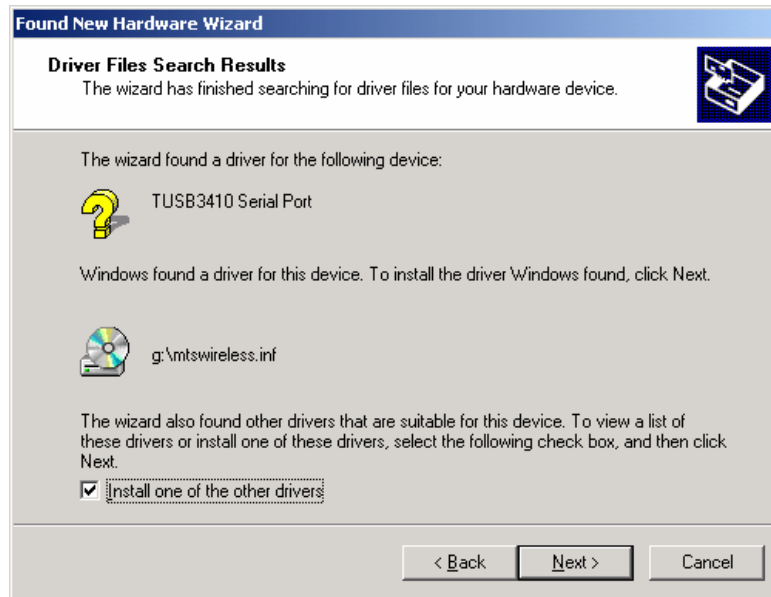


After a brief delay, the *Welcome to the Found New Hardware Wizard* screen appears. This is the first of three New Hardware Wizards that will appear.

Click **Next**.

3. The *Install Hardware Device Drivers* screen appears referring to the **TUSB3410 Serial Port** device.
4. Click on **Search for a suitable driver for my device (recommended)**
Click **Next**.
5. The *Locate Driver Files* screen appears. Click in the Optional search locations: on **CD-ROM drive** option.
Click **Next**.

- The *Driver Files Search Results* screen appears. The wizard has found the wrong driver. Click on **Install one of the other drivers**. Click **Next**.



- At the *Driver Files Found* screen, choose the **CDMA Device** from the listing. Click **Next**.
- A *Digital Signature Not Found* screen may appear depending on operating system settings. Click **Yes**.
- At the *Completing the Found New Hardware Wizard* screen, click **Finish**.

Installation of the USB driver is now complete.

The second *Found New Hardware* wizard will start automatically to associate the PC port with the USB driver.

Part B for Windows 2000: Associating PC Port with USB Driver

1. Wait while Windows prepares the next phase of the installation (associating the PC port with the USB drive). When the *Welcome to the Found New Hardware Wizard* screen appears, click **Next**.
2. The *Install Hardware Device Drivers* screen appears referring to the Texas Instrument UMP Serial Port. This is the beginning of the “Found New Hardware” sequence for the port. Click on **Search for a suitable driver for my device (recommended)**. Click **Next**.



3. The *Locate Drivers Files* screen appears. Ensure that **CD-ROM driver** is the only option checked. Click **Next**.
4. The *Driver Files Search Results* screen appears with the Texas Instruments UMP Serial Port device listed with the location of the driver. Click **Next**.
5. The *Completing the Found New Hardware Wizard* screen appears. The association between the serial port and the USB driver has been made.
6. Click **Finish**.

The third Found New Hardware Wizard will start automatically to install the modem INF file.

Part C for Windows 2000: Installing the Modem INF File

1. After a brief delay, the *Welcome to the Found New Hardware Wizard* screen appears. Click **Next**.
2. The *Install Hardware Device Drivers* screen appears, referring to the Multi-Tech CDMA modem. Click on **Search for a suitable driver for my device (recommended)**. Click **Next**.
3. The *Locate Drivers Files* screen appears. Ensure that CD-ROM drive is the only option checked. Click **Next**.
4. The *Driver Files Search Results* screen appears with the Multi-Tech – CDMA Modem device listed with the location of the driver. Click **Next**.
5. A *Digital Signature Not Found* screen may appear depending on operating system settings. Click **Yes**.
6. The *Completing the Found New Hardware Wizard* screen appears. Click **Finish**.

With the modem .inf file successfully installed, the entire software installation procedure for the Wireless USB MultiModem is complete.

Chapter 3 – Using Your Wireless Modem

Phone Numbers for the Wireless Modem

- Every wireless modem will have its own unique phone number.
- The phone number will be given to you by your wireless service provider. Wireless provider implementations may vary.

Examples of Useful AT Commands

A Note About HyperTerminal

In order to verify signal strength and roaming status, you must use a terminal application such as HyperTerminal. To open this program in Windows XP or Windows 2003, go to **Start > All Programs > Accessories > Communications > HyperTerminal**. Other Windows operating systems have similar paths to HyperTerminal. See your system's online Help if you cannot find it.

A Note About AT Commands

CDMA commands is included on the MultiModem CD and on the Multi-Tech Web site. The following two commands let you query signal strength and roaming status.

Verifying Signal Strength

Using **HyperTerminal**, type **AT+CSQ**

The modem responds with the received signal strength (rssi) and bit error rate (ber). BER values are always 99.

RSSI ranges are from 0 to 31.

Signal Strength Verification – RSSI	
10 - 31	Sufficient
0 - 9	Weak or Insufficient
99	No signal

Note: Modems provisioned for the Sprint network have a different range of values for signal strength. See the AT Command guide for details.

Checking Network Registration and Roaming Status

In this procedure, you will verify that the Wireless MultiModem has been registered on the wireless network.

Using **Hyperterminal**, type **AT+CREG?**

The modem will respond in one of the following ways:

Network Registration Verification	
Value	Network Registration Status
0,0	The modem is not registered on any network
0,1	The modem is registered on the home network
0,5	The modem is registered on a network and it is roaming

Note: If the modem indicates that it is not registered, verify the signal strength to determine if the problem is the strength of the received signal.

Checking the Modem's Identity

Use the **ATI** command (Note: This command is illustrated using the capital letter i after **AT**)

- Type **ATI0** (Note: The command ends in a zero)
The manufacturing data displays. For example, xxxxx Modem 800 1900
- Type **ATI3**
The software version displays. For example, S/W VER: xxxxx
- Type **ATI6**
The capability data displays. For example, +CGSM, +CIS707, ...

Establishing a Voice Call

- **Initiate a voice call**

Type **ATD1234;** (Note: Don't forget the semicolon “;” at the end. This stands for *voice* calls)

Responses: OK (Communication established)
 CME ERROR : 11 (PIN Code not entered [with +CMEE : 1 mode])
 CME ERROR : 3 (Operation not allowed)

- **Initiate an emergency call**

Type **ATD112;** (Note: Don't forget the semicolon “;” at the end. This stands for *voice* calls)

Responses: OK

- **Hang up**

Type **ATH**

Responses: OK

Establishing a Circuit-Switched Data (CSD) Connection

A Circuit-Switched Data Connection makes the wireless modem work like a regular analog modem. You must have CSD service in order to make a CSD call.

Establish a Connection: Using HyperTerminal or a terminal application, you can establish a CSD connection by entering the following command: **ATD<phone number>**

Notes:

- The phone number you are calling is entered between the displayed brackets. Do not type additional brackets. For example, type only **ATD 8585551212**. **8285551212** is typed between the brackets.
- This command tells the modem to inform the wireless network that you are initiating a CSD modem call. If you are dialing to another modem, the remote modem should answer and a connection between the two modems will be established. If you include a semi-colon (;) at the end of the dialing string, the modem will instead initiate a Voice call to the phone number dialed.

Disconnect:

Type: **+++**

Wait about two seconds to see an OK response.

Then type: **ATH**

Note: **+++** is the escape sequence and **ATH** is the Hang-up command.

Answering a Circuit-Switched Data (CSD) Connection

A Circuit-Switched Data Connection makes the wireless modem work like a regular analog modem. You must have CSD service in order to answer a CSD call.

Establish A Connection: Using HyperTerminal or a terminal application, enter the following command:

AT+CICB=0 <cr> This sets the modem to answer in data mode.

Then, call into the modem by dialing the number provided by your carrier.

Answer a Call:

When you see the RING responses on the terminal screen, enter **ATA <cr>** to answer the call.

Set Auto-Answer:

Enter **ATS0=x**

This sets the modem to auto-answer. The call will be answered after the number of rings entered. **x** stand for the number rings.

Then call into the modem by dialing the number provided to you by the carrier.

Disconnect:

Type: **+++**

Wait about two seconds to see an OK response.

Then type: **ATH**

Using Short Message Services (SMS)

Send a Short Message to a Specified Number.

Type **AT+CMGS="8585551212" <press Enter>**

Then type your message: **Please call me soon. <press ctrl Z>**

The modem may respond with **+CMGS:<mr> OK**

Write a Message to Memory.

You can store a message to send it at a later date.

Type **AT+CMGW="8585551212" <press Enter>**

Type the message. **<press ctrl Z>**

The modem may respond with **+CMGW: 4 OK** (The message is stored in the index as message 4.)

Send a Message from Storage.

Type **AT+CMSS=x,"8585551212" <press Enter>**

The modem may respond with **+CMSS: 1 OK** (The transmission is successful. One SMS message is sent.)

Note: The **x** represents an index location.

View a List of Stored Messages.

Type **AT+CMGL=x <press Enter>**

For **x**, substitute one of the following:

"UNREAD" Show all unread messages.

"READ" Show all read messages.

"UNSENT" Show all unsent messages.

"SENT" Show all sent messages.

"ALL" Show all d messages.

The modem will respond **AT+CMGL: 1,"REC UNREAD","8585551212",1...**

The modem will continue until all UNREAD messages, numbers, and index number are listed.

Read a Stored Message.

Type **AT+CMGR=x <press Enter>**

The modem may respond with **+CMGR: "REC READ", "8585551212",**

Note: The **x** represents an index location.

Delete a Stored Message.

Type **AT+CMGD=x,n <press Enter>**

For **n**, substitute one of the following:

0 Delete message at location <include the index number>

1 Delete all READ messages.

2 Delete all READ and SENT messages.

3 Delete all READ, SENT, and UNSENT messages.

4 Delete ALL messages.

The modem will respond **OK**.

Note: The **x** represents an index location.

SMS Examples

Send Example: Sending an SMS message

```

at+cpms="MT","MO" (set the read and write locations for SMS)
+CPMS:0,30,0,30
OK
at+cmgs="7632273726" (send SMS to the number listed inbetween the quotes)
TEST message ONE. (type the text message here and end with a <CTRL + Z> to send the message)
+CMGS:1
OK

```

Receive Example 1: Receive an SMS message and stored to modem memory via +CMTI indication:

```

at+cnmi=2,1,0,0,0 (set the modem to indicate received messages with +CMTI)
OK
at+cpms="MT","MO" (set the read and write locations for SMS)
+CPMS:0,30,0,30
OK

+CMTI:"MT",0,0 (indication that a message was received and stored to location 0 of the modem)

at+cmgr=0 (read message stored in location 0)
+CMGR:"REC UNREAD","7632273726","06/03/17,13 :35 :49",0,3,0,0,0,5
TEST1
OK
at+cmgd=0 (delete message stored in location 0)
OK

```

Receive Example 2: Receive a SMS message and route directly to TE:

```

at+cnmi=2,2,0,0,0 (set modem to receive SMS and route directly to TE)
OK

+CMT:"7632273726","06/03/17,13 :38 :22",129,0,3,0,5 (indication that message was received)
TEST2
at+cnma (acknowledge that message was received)
OK

```

Internet Access

Internet access can be setup in Windows Dial-Up Networking (DUN) of the computer that the wireless modem is serving. Setup procedures will vary according to the type of wireless service provider used. To access *Dial-Up Networking* on your PC, go to **Start > Settings > Network Connections**.

- For point to point data, a circuit-switched data connection is used. The user can set up DUN to make a conventional V.32bis modem connection to any terminating modem at the other end. The phone number specified in DUN can be one supplied by the wireless service provider or another phone number related to a different dialup modem service (e.g., a dialup modem service phone number from any commercial or private dialup network).
- For CDMA 1x data, a single DUN number is generally used by all of a wireless provider's subscribers throughout its area of coverage (regional, nationwide, continental, etc.). Rather than being a literal phone directory number, as in conventional DUN, this is a code that gives the modem Internet access. Normally, this phone number is #777.

Connecting to the CDMA Network for Internet Access

You will establish an Internet connection through a Windows dial-up session.

Note that your wireless provider will charge you for data usage.

Requirements

- One Multi-Tech wireless CDMA USB modem
- The modem must be getting a proper signal and be showing a network registration through the wireless provider's network
- A PC running Windows XP or 2003 with the Multi-Tech drivers installed for your particular model

The following instructions are for Windows XP SP2 and Windows 2003. Every PC may have slight differences which may cause the instructions to be different. Use these instructions as a guide to help you understand what is required to set up an Internet connection through your wireless service provider for all operating systems.

Note: Cellular providers provide Internet services as part of your service plan. Multi-Tech recommends that if you plan on using large amounts of data, to sign up for an unlimited data service plan with your provider. Multi-Tech Systems, Inc. will not be responsible for any charges on your cellular bill. If you have any questions about billing, service plans, service charges, etc., please contact your provider for more information.

Create Your Dial-Up Connection in Windows XP/2003

1. Click on **Start** and then click on **Control Panel**.
2. In the *Control Panel*, double-click on **Network Connections**.
3. On the *Network Connections* screen on the left-hand side under **Network Tasks**, click on **Create a new connection**.
4. The *New Connection Wizard* should appear. It will walk you through setting up your Internet connection. Click on **Next >** to begin.
5. On the *Network Connection Type* screen, select **Connect to the Internet**, and then click **Next >**.
6. On the *Getting Ready* screen, select **Set up my connection manually**, and then click **Next >**.
7. On the *Internet Connection* screen, select **Connect using a dial-up modem**, and then click **Next >**.
Note: After clicking on Next, you may or may not be asked to select which modem to use. If you have more than one modem installed in your PC, you will be required to select the proper modem to use. If asked, please select the Multi-Tech wireless modem that has been installed.
8. On the *Connection Name* screen in the **ISP Name** box, type in a name for your new connection. You can give it any name that you would like. After you have typed in a name, click **Next >**.
9. On the *Phone Number to Dial* screen, type in the number that specifies to the modem to connect to your provider's Internet service.
 For CDMA USB modems, type in the number **#777**.
 Then click **Next >**.
10. On the *Connection Availability* screen, specify if this connection is for anyone's use or for your use only by checking the appropriate button. Choose your preference, and then click **Next>**.
11. On the *Internet Account Information* screen, type the user name and the password for your account. In many cases, a user name and a password are not required, but some wireless providers require it. Check with your provider to see if they are needed.

Here is some helpful information:

- **For Alltel accounts:**
 User name: <MDN>@alltel.net
Note: The MDN is your 10-digit wireless phone number.
 Password: alltel
- **For Verizon and Sprint accounts:**
 Normally, Verizon and Sprint do not require a user name and password.
- **Bell Mobility:**
 Bell Mobility may require a user name and password.
- **In all cases, please check with your service provider.**

Check the following two options if you would like them activated:

- Check the box if you want this account name and password to be used by everyone.
- Check the box if you want this as your default Internet connection. Then click **Next >**.

12. On the *Completing the New Connection Wizard* screen, your last task is to place a check in the box if you would like to add a shortcut to your desktop. Then click **Finish**.
13. A *Connection* screen displays on your desktop. Click the **Properties** button on the bottom of this screen.
14. The *Properties* window will open for you to make your connection. **Important:** Make sure that *Use dialing rules* is not selected, and then click **OK**.
15. Once back at your *Connection* screen, click the **Dial** button at the bottom of the screen to start the connection.
16. The connection will now tell the modem to connect to your provider's Internet service. Once connected, you should see the connection status icon in your system tray at the bottom right-hand corner of your screen.
 You should now be able to open Internet Explorer or any other browser of your preference to surf the Internet.

Disconnecting the Connection:

1. To disconnect the connection, right click on the connection icon in your system tray at the bottom right-hand corner of your screen.
2. Scroll up and click on **Disconnect**.
 Your should now be disconnect from the Internet.

Mobile PhoneTools

For initial configuration of your wireless device, Multi-Tech offers a Windows® based mobile PhoneTools Mobile PhoneTools is a communication software program included on your MultiModem CD. You can install this program onto your PC and use it for making Internet connections, voice calls, SMS messaging, and email. This program allows you to use your wireless modem hooked up to your PC as if it were a cell phone.

Chapter 4 – Troubleshooting and Frequently Asked Questions

Troubleshooting Examples

Situation A: The modem does not respond through the USB link

If the wireless MultiModem does not respond through the USB link upon an attempted transmission of data or voice signals, see the table below for possible causes and solutions.

Solutions for 'no connection through serial link' situation		
If the modem returns ...	Then ask ...	Action
	Is the communication program properly configured?	In communications program, verify that modem parameters have been set to the values shown here: Data bits = 8 Parity = none Stop Bits = 1 Baud = 115200 bps
	Is another program interfering with the communication program?	Close any such application program.

Frequently Asked Questions

I just received this modem, what do I need to do?

- You will need to call a carrier and register the ESN number with them. Sprint models (N2) must call Sprint and Verizon models (N3) must call Verizon. Other models, N1 and N4, must contact their provider.
- You must then activate the modem: We have Sprint and Verizon models that are preconfigured and just needs to run through the activation steps.
- The N1 models will need more configuration using AT commands in the Reference Guide. If that doesn't help, they may need to use the WPST provisioning tool.
- The N4 model uses a RUIM card, similar to a SIM card.

Who are the carriers?

- Sprint, Verizon, and Alltel.

I have the N1 model and I can't get it activated on my carrier's network.

- You will need to configure the MDN, MIN, and maybe more settings such as the primary and secondary channels, and the Home SID and UID.
- The commands are: +WMDN (MDN), +WIMI (MIN), +WPCC (Primary channel), +WSCC (Secondary channel), +WSID (SID and UID), and +WCMT=1 (to store changes)
- You may need more settings set, so you may need to use the WPST provisioning tool application.

Note: N1 models are usually used for developmental purposes, so the customer will usually be working with a carrier to get this activated on their network. It is always best for the customer to be working with the carrier when they are activating a N1 model.

I activated my modem but I can't do anything with it. When I try to dial out, I get a NO CARRIER response.

- If you are receiving a NO CARRIER response, send 'AT+CEER' to check the reason for no carrier, then check the number in the Reference Guide.
- Make sure the modem is registered and getting good signal: AT+CREG and AT+CSQ.
- Make sure the modem is activated and provisioned correctly.

I am trying to activate my Sprint modem. When I do the 'AT+WIOTA=1', I get an error of 1012 back.

- Please check with Sprint to make sure your ESN, MDN, and MSID are correct. Also, make sure that the MDN and MSID were inserted correctly into the modem.

How do I originate a voice or data call?

- 'ATD<number>,' for voice call.
- 'ATD<number>' for data call.

Why does the modem answer and then do nothing?

- The modem is answering in voice mode.
- If you want to answer a data call, make sure the account has CSD service.
- You will need to set 'AT+CICB=0' to make the modem answer in data mode.

When I try to make a data connection by dialing to my analog modem from the wireless, why does the analog modem answer and send tones, but never connect?

- Make sure you are using the correct dialing string. You must send 'ATD<number>' for a data call.
- Make sure the account has CSD service.

How do I get the voice portion to work so that I can talk to others?

- You will need a cable that has the speaker pins connected to a speaker and mic.
- We have a "Y" cable that splits out to a RJ9 connector that can be used to plug into the receiver of a handset.
- Verizon modems currently do not support voice.

When I try to make a data call using 'ATD<number>', I get a NO CARRIER response.

- Check 'AT+CEER' for NO CARRIER reason and look it up in Reference Guide.
- Check the number that you are dialing.
- Make sure you have CSD service.
- Check registration and signal to make sure modem is registered and getting good signal: +CREG, +CSQ.
- Make sure you went through the activation procedures correctly.

How do I make a CSD dial-up connection in Windows to my ISP?

- Create a dial-up connection to the ISP's access # and use the correct password and username.
- You must have CSD service.

Does this modem support High-Speed Circuit-Switched Data (HSCSD)?

- No, our CDMA modems do not support HSCSD.

The modem will not answer.

- Set the modem to autoanswer with 'ATS0=1' and 'AT&W' to store the setting.
- Send 'ATA' to the modem once the RING is indicated on the terminal screen.
- You may need to set the modem to ignore DTR, 'AT&D0', if your system doesn't provide DTR.

The modem answers, but does nothing.

- Modem is answering in voice mode.
- Voice: Need a voice cable; such as our "Y" cable.
- Data: Make sure you set 'AT+CICB=0' to make the modem answer in data mode.

How does faxing work?

- The CDMA modems only support Class 2.0 Group 3 faxing.
- Need fax services setup on the account.
- Need fax software that supports the modem; e.g., WinFax Pro v10.0.
- Need to set 'AT+CICB=1' for modem to answer in fax mode.

When I set the S0 command, store it with &W; then send "ATZ" to the modem, the command goes back to the default of 0?

- This is a bug in the modem. S0 will store just fine, as long as "ATZ" doesn't get sent to the modem.

After I set the E and &D commands followed by &W, it looks to be stored okay, but as soon as I recycle power on the unit the E and &D commands get set back to default of E1 and &D2.

- This is a bug in the modem. These commands will not store correctly. If modems are powered back up and an "ATZ" is sent to the modem, then &D and E will load to your stored settings correctly.
- Firmware versions 210 and above fixes the storage of the E command.

After I set the Q, V, and &S commands followed by &W, if I recycle power or send ATZ to the modem the settings will get set back to default.

- Bug in the modem. These commands will not store.

What is the max supported serial baud rate?

- 230,400 bps is the max.

Chapter 6 – Reference Information

Wireless Modem Reference Information

General

ETSI contact: ETSI Secretariat
F-06921 Sophia Antipolis Cedex, France
e-mail: secretariat@etsi.fr

Service: The AT commands manual is available on the MultiModem CD and the Multi-Tech web site.

Appendix A – Warranty and Repairs

Multi-Tech Warranty Statement

Multi-Tech Systems, Inc., (hereafter “MTS”) warrants that its products will be free from defects in material or workmanship for a period of two, five, or ten years (depending on model) from date of purchase, or if proof of purchase is not provided, two, five, or ten years (depending on model) from date of shipment.

MTS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by Customer or any party without MTS’s written authorization, or used in any manner inconsistent with MTS’s instructions.

MTS’s entire obligation under this warranty shall be limited (at MTS’s option) to repair or replacement of any products which prove to be defective within the warranty period or, at MTS’s option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS’s factory — transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES, AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PRICE FOR DEFECTIVE PRODUCTS.

Repair Procedures for U.S. and Canadian Customers

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota factory:

Multi-Tech Systems, Inc.
2205 Wooddale Drive
Mounds View, MN 55112 U.S.A
Attn: Repairs, Serial # _____

A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS to destinations in U.S. and Canada.

Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a check or purchase order for repair charges.

For out of warranty repair charges, go to [COMPANY/Policies/warranty/](#)

Extended two-year overnight replacement service agreements are available for selected products. Please call MTS customer service at (888) 288-5470 or visit our web site at [COMPANY/Programs/overnight_replacement](#) for details on rates and coverage’s.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at (800) 972-2439 or email support@multitech.com. Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at (800) 328-9717 or (763) 717-5631, or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Customers

(Outside U.S.A. and Canada)

Your original point of purchase Reseller may offer the quickest and most economical repair option for your Multi-Tech product. You may also contact any Multi-Tech sales office for information about the nearest distributor or other repair service for your Multi-Tech product. The Multi-Tech sales office directory is available at http://www.multitech.com/COMPANY/contact_us/

In the event that factory service is required, products may be shipped, freight prepaid to our Mounds View, Minnesota factory. Recommended international shipment methods are via Federal Express, UPS or DHL courier services, or by airmail parcel post; shipments made by any other method will be refused. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a check in U.S. dollars drawn on a U.S. bank or your company's purchase order for repair charges. Repaired units shall be shipped freight collect, unless other arrangements are made in advance.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you or email support@multitech.com. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A., or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Distributors

International distributors should contact their MTS International sales representative for information about the repair of the Multi-Tech products.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our International Technical Support department at +(763)717-5863. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A. or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis

Replacement Parts

SupplyNet, Inc., can supply you with replacement power supplies, cables and connectors for selected Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at the following addresses:

Mail: SupplyNet, Inc.
614 Corporate Way
Valley Cottage, NY 10989
Phone: 800 826-0279
Fax: 914 267-2420
Email: info@thesupplynet.com
Internet: <http://www.thesupplynet.com>

Appendix B - Waste Electrical and Electronic Equipment (WEEE) Statement

July, 2005

The WEEE directive places an obligation on EU-based manufacturers, distributors, retailers and importers to take-back electronics products at the end of their useful life. A sister Directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

